Titles and Abstracts

Periods formulae for theta lifting from SO(3) to SL(2)

Wei He

In this talk, we will introduce several periods formulae for the theta lifting from SO(3) to metaplectic SL(2). Then, we will introduce some arithmetic applications to quadratic twist family of elliptic curves. This is joint work with Prof. Ye Tian and Prof. Wei Xiong.

Quadratic twists of elliptic curves and applications

Yong-Xiong Li

In this talk, we review various methods and results in the study on L-values of quadratic twists of elliptic curves. Then we give several applications to arithmetic problems.

Mazur's main conjecture at Eisenstein primes

Francesc Castella

In this talk, I will describe the main ingredients in the recent proof (joint with Giada Grossi and Chris Skinner) of Mazur's main conjecture for elliptic curves at Eisenstein primes under a mild hypothesis. If time permits, I will also discuss work aimed at extending this result.

On the arithmetic of special values for Eisenstein modular abelian varieties

Jun Wang

Let N and p be primes ≥ 5 such that $p \parallel N - 1$. In this situation, Mazur defined and studied the p-Eisenstein quotient $\tilde{J}^{(p)}$ of $J_0(N)$. I will talk about a modulo p version of the Birch and Swinnerton-Dyer conjecture for the "p-Eisenstein part" of even quadratic twists of $\tilde{J}^{(p)}$, which is an analogue of a result of Mazur concerning odd quadratic twists. This is joint work with Emmanuel Lecouturier.

Second moment of modular symbols

Hae-Sang Sun

Mazur-Rubin conjecture presents precise form of the variance of modular symbols over the rationals with a fixed denominator. An average version is proved by Petridis-Risager and the original version for prime denominators is proved by Blomer-Fouvry-Kowalski-Michel-Milicevic-Sawin. In the talk, I will introduce how to use the theory of continued fractions to study the conjecture. This is ongoing research joint with Hong Kwon.

Ergodic proof of an equidistribution result of Ferrero-Washington

Jungwon Lee

We sketch and reprove the main equidistribution instance in the Ferrero-Washington proof of the vanishing of Iwasawa mu-invariant, based on the ergodicity of a certain p-adic skew-product extension dynamical system that can be identified with Bernoulli shift (joint with Bharathwaj Palvannan).

Variations on Iwasawa Main Conjectures with coefficients in Hecke algebras for modular motives

Olivier Fouquet

The generalized Iwasawa Main Conjectures of Kato predict the variation of special values of L-functions in p-adic families of modular motives. I will outline a proof of them under favorable hypotheses assuming they hold for the cyclotomic deformation and explain as a consequence the the proof of some new equivariant refinement special value formulae for the L-function of an eigencuspform (including an equivariant action by a p-group, a case which is considered harder).

Ceci n'est pas la conjecture de Birch et Swinnerton-Dyer

Chan-Ho Kim

Let f be a cuspidal newform with trivial nebentypus and p be an odd prime such that the associated p-adic Galois representation has large image. We present another refined special L-value formula for the Bloch-Kato Selmer group of the central critical twist of f only under a small part of the Iwasawa main conjecture. Our formula is insensitive to weight, the analytic rank, and the local automorphic behavior of f at p. As consequences, we obtain the non-vanishing of Kato's Kolyvagin system and complete a "discrete" analogue of the Beilinson–Bloch–Kato conjecture for modular forms at ordinary primes. Numerical examples will be provided.

Harris–Venkatesh plus Stark

Robin Zhang

The class number formula describes the behavior of the Dedekind zeta function at s = 0. The Stark conjecture extends the class number formula, describing the behavior of Artin L-functions at s = 0 in terms of units. The Harris–Venkatesh conjecture serves as the first verifiable part of the broader conjectures of Venkatesh and Prasanna–Venkatesh, describes the residue of Stark units modulo p, and gives a modular analogue to the Stark conjecture. In this talk, I will draw an introductory picture, formulate a unified conjecture combining Harris–Venkatesh and Stark for modular forms of weight 1, and describe the proof of this in the imaginary dihedral case. Time permitting, I will also describe some new questions and in-progress work modulo p^n.

Generalised Euler characteristics of Selmer groups for non-CM elliptic curves

Yukako Kezuka

We consider an elliptic curve E which does not admit complex multiplication, and discuss its arithmetic over the cyclotomic $\mathbf{Z}_p$-extension and more general p-adic Lie extensions of various base fields F . After reviewing some known results over number fields, we shift our focus to the case of global function fields. In this context, we introduce an invariant which is defined without assuming the finiteness of the Selmer group of E over the base field F .

First explicit reciprocity law for unitary Fridberg–Jacquet periods

Murilo Corato Zanarella

In the early 2000's, Bertolini and Darmon introduced a new technique to bound Selmer groups of elliptic curves via level raising congruences. This was the first example of what is now termed a "bipartite Euler system", and over the last decade we have seen many breakthroughs on constructing such systems for other Galois representations, including settings such as twisted and cubic triple product, symmetric cube, and Rankin– Selberg, with applications to the Bloch–Kato conjecture and to Iwasawa theory.

For this talk, I'll consider Galois representations attached to automorphic forms on a totally definite unitary group U(2r) over a CM field which are distinguished by the subgroup U(r)×U(r). I'll discuss a new "first explicit reciprocity law" in this setting and its application to the corre-sponding Bloch–Kato conjecture, focusing on new obstacles which arise from the lack of local multiplicity one.

Generation of Hecke fields by products of modular L-values with cyclotomic twists

Jun-Hwi Min

Let f and g be non-CM newforms. For an odd prime p, we let χ denote a Dirichlet character with p-power conductor and order. Thanks to the work of Shimura, it is known that there exist algebraic central modular L-values $L_f(\chi)$ and $L_g(\chi)$. We prove that the Hecke field $\mathbf{Q}_f \mathbf{Q}_g(\chi)$ is generated by the product $L_f(\chi)L_g(\chi)$. The main idea of this talk is inspired by the works of Blomer-Milicevic [The second moment of twisted modular L-functions(2015)] and Sun [Generation of Cyclotomic Hecke Fields by Modular L-Values with Cyclotomic Twists(2019)]. This is a joint work with Ashay Burungale.

Control theorem of Selmer groups for residually reducible Hida families at Eisenstein intersection points

Dong Yan

To study Iwasawa theory for residually reducible Galois deformations, one of subtle points in this case is that the lattice is not unique up to homothety and properties of Selmer group may depend on the choice of lattice. In this talk, we give a result on control theorem of Selmer groups for every lattice in a two-variable residually reducible Hida family, especially at Eisenstein intersection points which do not exist in the residually irreducible case. Then by specialization, this result enables us to know the precise statement of the main conjecture in more general cases as we will remark in the talk.

Overconvergence of CM forms

Yangyu Fan

In this talk, we will discuss the overconvergence of the infinite slope p-adic family of theta series, which comes from a p-adic family of Hecke characters on an imaginary quadratic field in which p is non-split. If time permits, we will also explain applications to the construction of p-adic Rankin series.